Contribution ID: **53** Type: **Oral**

Assessment of IEEE 1588-based timing system of the ITER Neutral Beam Test Facility

Tuesday, 6 July 2021 16:40 (10 minutes)

MITICA is one of the two ongoing experiments at the ITER Neutral Beam Test Facility (NBTF) located in Padova (Italy). MITICA aims to develop the full-size neutral beam injector of ITER and, as such, its Control and Data Acquisition System will adhere to ITER CODAC directives. In particular, its timing system will be based on the IEEE1588 PTPv2 protocol and will use the ITER Time Communication Network (TCN).
Following the ITER device catalog, the National Instruments PXI-6683(H) PTP timing modules will be used to generate triggers and clocks that are synchronized with a PTP grandmaster clock. Data acquisition techniques, such as lazy triggers [1], will be also used to implement also event-driven data acquisition without the need of any hardware link in addition to the Ethernet connections used to transfer data and timing synchronization.
In order to evaluate the accuracy over time that can be achieved with different network topologies and configurations, a test system has been set-up consisting of a grand master clock, two PXI-6683(H) devices and two PTP aware network switches. In particular, the impact on accuracy due to the transparent and boundary clocks configurations has been investigated. In addition, a detailed simulation of the network and the involved devices has been performed using the OMNET++ discrete event simulator. The simulation parameters include not only the network and switches configuration, but also the PID parameters used in the clock servo controllers. A comparison between simulated and measured statistics is reported, together with a discussion on the possible optimal configuration strategies.

Member State or IGO

Italy

Speaker's Affiliation

Consorzio RFX

Primary authors: Mr TREVISAN, Luca (Consorzio RFX); LUCHETTA, Adriano (Consorzio RFX & Consiglio Nazionale delle Ricerche); MANDUCHI, Gabriele; Mr TALIERCIO, Cesare (Consorzio RFX and CNR-ISTP); Dr RIGONI, Andrea (Consorzio RFX); Mr BARBATO, paolo (Consorzio RFX)

Presenter: Mr TREVISAN, Luca (Consorzio RFX)

Session Classification: Fast Network Technology and its Application

Track Classification: Machine Control, Monitoring, Safety and Remote Manipulation